

CLAIMS

1. A digital signal processing method for converting a digital audio signal, comprising:

~~the~~ frequency analysis ~~step~~ of calculating power spectrum data from said digital audio signal;

~~the~~ spectrum data extracting ~~step~~ of extracting a part of power spectrum data from said power spectrum data;

~~the~~ classification ~~step~~ of classifying said digital audio signal based on said part of power spectrum data; and

~~the~~ predictive operation ~~step~~ of generating a new digital audio signal formed by converting said digital audio signal by a predicting method corresponding to said classified class.

2. The digital signal processing method according to claim 1, wherein:

in said frequency analysis step, various operation processing methods of window function are provided; and

a desired operation processing method is used according to ~~the~~ frequency characteristic of said digital audio signal.

3. The digital signal processing method according to claim 1, wherein;

in said spectrum data extracting step, power spectrum

data having DC component is excepted when said part of power spectrum data is extracted.

4. The digital signal processing method according to claim 1, wherein;

in said predictive operation step, a predictive coefficient that has previously generated by learning based on a desired digital audio signal is used.

5. The digital signal processing method according to claim 1, wherein:

said power spectrum data is formed by almost symmetric components; and

in said spectrum data extracting step, either right or left of the components is an object to be extracted, in said power spectrum data.

6. A digital signal processing apparatus for converting a digital audio signal, comprising:

frequency analysis means for calculating power spectrum data from said digital audio signal;

spectrum data extracting means for extracting a part of power spectrum data from said power spectrum data;

classification means for classifying said digital audio signal based on said part of power spectrum data; and

predictive operation means for generating a new digital audio signal formed by converting said digital audio signal by a predicting method corresponding to said classified class.

7. The digital signal processing apparatus according to claim 6, wherein:

said frequency analysis means provides various operation processing means of window function; and

desired operation processing means is used according to the frequency characteristic of said digital audio signal.

8. The digital signal processing apparatus according to claim 6, wherein;

said spectrum data extracting means excepts power spectrum data having DC component when said part of power spectrum data is extracted.

9. The digital signal processing apparatus according to claim 6, wherein;

said predictive operation means uses a predictive coefficient that has previously generated by learning based on desired digital audio signal.

10. The digital signal processing apparatus according to

claim 6, wherein:

said power spectrum data is formed by almost symmetric components; and

said spectrum data extracting means extracts either right or left of the components in said power spectrum data.

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11. A program storage medium for making a digital signal processing apparatus execute a program, comprising:

the frequency analysis step of calculating power spectrum data from a digital audio signal;

the spectrum data extracting step of extracting a part of power spectrum data from said power spectrum data;

the classification step of classifying said digital audio signal based on said part of power spectrum data; and

the prediction step of generating a new digital audio signal formed by converting said digital audio signal by a predicting method corresponding to said classified class.

12. The program storage medium according to claim 11, wherein:

in said frequency analysis step, various operation processing methods of window function are provided; and

a desired operation processing method is used according to the frequency characteristic of said digital audio signal.

13. The program storage medium according to claim 11,
wherein;

in said spectrum data extracting step, power spectrum data having DC component is excepted when said part of power spectrum data is extracted.

14. The program storage medium according to claim 11,
wherein:

said power spectrum data is formed by almost symmetric components; and

in said spectrum data extracting step, either right or left of the components is an object to be extracted, in said power spectrum data.

15. A learning method for generating a predictive coefficient to be used in a digital signal processing device for converting a digital audio signal, in prediction of said conversion processing, comprising:

the learner digital audio signal generating step of generating a learner digital audio signal that desired digital audio signal ^{which is referred to} has deteriorated;

the frequency analysis step of calculating power spectrum data from said learner digital audio signal;

the spectrum data extracting step of extracting a part of power spectrum data from said power spectrum data;

{ the classification step } of classifying said digital audio signal based on said part of power spectrum data; and
{ the predictive coefficient calculating step } of calculating a predictive coefficient corresponding to { said class } based on said digital audio signal and said learner digital audio signal.

16. The learning method according to claim 15, wherein:
in said frequency analysis step, various operation processing methods of window function are provided; and
a desired operation processing method is used according to { the frequency characteristic } of said digital audio signal.

17. The learning method according to claim 15, wherein;
in said spectrum data extracting step, power spectrum data having DC component is excepted when said part of power spectrum data is extracted.

18. The learning method according to claim 15, wherein:
said power spectrum data is formed by almost symmetric components; and
in said spectrum data extracting step, either right or left of the components is an object to be extracted, in said power spectrum data.

19. A learning device for generating a predictive coefficient to be used in a digital signal processing apparatus for converting a digital audio signal, in predictive operation of said conversion processing, comprising:

learner digital audio signal generating means for generating a learner digital audio signal that desired digital audio signal has deteriorated;

frequency analysis means for calculating power spectrum data from said learner digital audio signal;

spectrum data extracting means for extracting a part of power spectrum data from said power spectrum data;

classification means for classifying said digital audio signal based on said part of power spectrum data; and

predictive coefficient calculating means for calculating a predictive coefficient corresponding to said class based on said digital audio signal and said learner digital audio signal.

20. The learning device according to claim 19, wherein:

said frequency analysis means provides various operation processing means of window function; and

desired operation processing means is used according to the frequency characteristic of said digital audio signal.

21. The learning device according to claim 19, wherein;
said spectrum data extracting means excepts power
spectrum data having DC component when said part of power
spectrum data is extracted.

22. The learning device according to claim 19, wherein:
said power spectrum data is formed by almost symmetric
components; and
said spectrum data extracting means extracts either
right or left of the components in said power spectrum data.

23. A program storage medium for making a digital signal
processing apparatus execute a program comprising:

the learner digital audio signal generating step of
generating a learner digital audio signal that desired
digital audio signal has deteriorated, *refer to when*

the frequency analysis step of calculating power
spectrum data from said learner digital audio signal;

the spectrum data extracting step of extracting a part
of power spectrum data from said power spectrum data;

the classification step of classifying said digital
audio signal based on said part of power spectrum data; and

the predictive coefficient calculating step of
calculating a predictive coefficient corresponding to said
class based on said digital audio signal and said learner

digital audio signal.

24. The program storage medium according to claim 23,
wherein:

in said frequency analysis step, various operation
processing methods of window function are provided; and

^a desired operation processing method is used according
to {the frequency characteristic} of said digital audio signal.

25. The program storage medium according to claim 23,
wherein;

in said spectrum data extracting step, power spectrum
data having DC component is excepted when said part of power
spectrum data is extracted.

26. The program storage medium according to claim 23,
wherein:

said power spectrum data is formed by almost symmetric
components; and

in said spectrum data extracting step, either right or
left of the components is an object to be extracted, in said
power spectrum data.